FCC TEST REPORT

(Part 15, Subpart C)

Applicant:	MMD Hong Kong Holding Limited
Address:	Units 1208-11, 12th Floor, C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong

Manufacturer or Supplier:	MMD Hong Kong Holding Limited
Address:	Units 1208-11, 12th Floor, C-Bons International Center, 108 Wai Yip Street, Kwun Tong, Kowloon, Hong Kong
Product:	Wireless subwoofer
Brand Name:	PHILIPS
Model Name:	TAB7908/37
Serial Model Name:	TAB7908, TAB7908RE, TAB7908/10, TAB7908RE/10, TAB7908RE/37, TAB7908/93, TAB7908/98, TAB7908RE/98, TAB7908xx/yy (xx=A-Z or blank, yy=00-99 or blank for country code)
FCC ID:	2AR2STAB7908SW
Date of tests:	Apr. 13, 2023 ~ May. 25, 2023

The tests have been carried out according to the requirements of the following standard:

☒ **47 CFR FCC Part 15, Subpart C, Section 15.249**

☒ **47 CFR FCC Part 15, Subpart C, Section 15.203**

☒ **ANSI C63.10-2013**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Simon Wang	Approved by Luke Lu
Engineer / Mobile Department	Manager / Mobile Department
Simon Wang	Luke Lu
Date: May. 25, 2023	Date: May. 25, 2023

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P23040008-1RF01	Original release	May. 25, 2023

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C		
STANDARD	**TEST TYPE AND LIMIT**	**RESULT**
15.207	AC Power Conducted Emission	Compliance
15.249 (a)	Field Strength of the Fundamental Signal	Compliance
15.249 (d)	Restricted Band Around Fundamental Frequency	Compliance
47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Radiated Emissions Below 1GHz	Compliance
47 CFR Part 15, Subpart C 15.205 & 15.249(d) &15.209	Restricted Band Around Fundamental Frequency	Compliance
47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Radiated Emissions Above 1GHz	Compliance
15.203	Antenna Requirement	Compliance
15.215	Channel Bandwidth Measurement(20 dB bandwidth)	Compliance

NOTE:

Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

Test Lab Information Reference:

BV 7Layers Communications Technology (Shenzhen) Co., Ltd

Lab Address:

No.B102, Dazu Chuangxin Mansion, North of Beihuan Avenue, North Area, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, China

Accredited Test Lab Cert 3939.01

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
AC Power Conducted emissions	±2.70dB
Radiated emissions (9kHz ~ 30MHz)	±2.68dB
Radiated emissions (30MHz~1GHz)	±4.98dB
Radiated emissions (1GHz ~6GHz)	±4.70dB
Radiated emissions (6GHz ~18GHz)	±4.60dB
Radiated emissions (18GHz ~40GHz)	±4.12dB
Occupied Channel Bandwidth	±43.58KHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless subwoofer
BRAND NAME	PHILIPS
MODEL NAME	TAB7908/37
SERIAL MODEL NAME	TAB7908, TAB7908RE, TAB7908/10, TAB7908RE/10, TAB7908RE/37, TAB7908/93, TAB7908/98, TAB7908RE/98, TAB7908xx/yy (xx=A-Z or blank, yy=00-99 or blank for country code)
NOMINAL VOLTAGE	Input: 100-240Vac, 50/60Hz, 24W
MODULATION TECHNOLOGY	DTS
MODULATION TYPE	GFSK
OPERATING FREQUENCY	5729MHz-5849MHz
NUMBER OF CHANNEL	61
FIELD STRENGTH	90.84dBuV/m (3m Average)
ANTENNA TYPE	PCB Antenna with 0.5dBi gain
HW VERSION	V0.4
SW VERSION	VB2
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	Power Line 1: non-shielded cable, with w/o ferrite core, 1.54 meter

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. Model difference: All models are identical except model name and country destination for marketing purpose.

2.2 DESCRIPTION OF TEST MODES

61 channels are provided to this EUT:

CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)	CHANNEL	FREQ. (MHz)
1（Low）	5729	21	5769	41	5809	61（High）	5849
2	5731	22	5771	42	5811		
3	5733	23	5773	43	5813		
4	5735	24	5775	44	5815		
5	5737	25	5777	45	5817		
6	5739	26	5779	46	5819		
7	5741	27	5781	47	5821		
8	5743	28	5783	48	5823		
9	5745	29	5785	49	5825		
10	5747	30	5787	50	5827		
11	5749	31（Mid）	5789	51	5829		
12	5751	32	5791	52	5831		
13	5753	33	5793	53	5833		
14	5755	34	5795	54	5835		
15	5757	35	5797	55	5837		
16	5759	36	5799	56	5839		
17	5761	37	5801	57	5841		
18	5763	38	5803	58	5843		
19	5765	39	5805	59	5845		
20	5767	40	5807	60	5847		

2.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 4 photograph of the test configuration for reference.

2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE<1G	RE≥1G	PLC	APCM	
-	√	√	√	√	-

Where **RE<1G:** Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.
"-"means no effect.

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED FREQUENCY
5.8G SRD	1-61	High

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.
☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED FREQUENCY
5.8G SRD	1-61	Low, Mid, High

POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture) and packet type.

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED FREQUENCY
5.8G SRD	1-61	High

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, antenna ports (if EUT with antenna diversity architecture), and packet types.

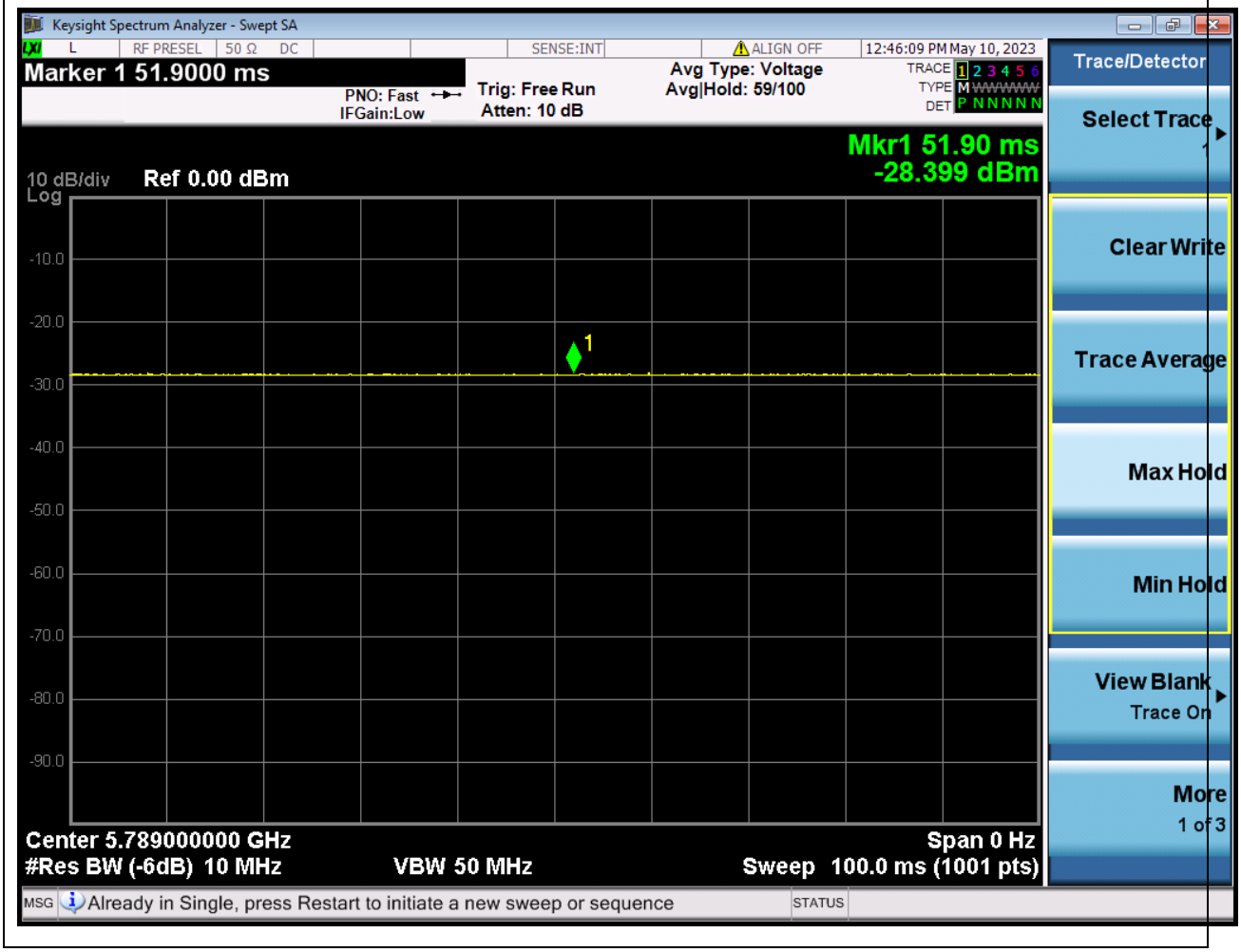
☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED FREQUENCY
5.8G SRD	1-61	Low, Mid, High

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE (SYSTEM)	TESTED BY
RE<1G	23deg. C, 70%RH	AC 120V	Jace Hu
RE≥1G	23deg. C, 70%RH	AC 120V	Jace Hu
PLC	23deg. C, 56%RH	AC 120V	Carl Xie
APCM	25deg. C, 60%RH	AC 120V	James Fu

2.3 DUTY CYCLE OF TEST SIGNAL

5789MHz


Note: Duty cycle of test signal is > 98%, duty cycle factor needn't be considered.

2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

47 CFR FCC Part 15, Subpart C. Section 15.249
47 CFR FCC Part 15, Subpart C, Section 15.203
ANSI C63.10-2013

NOTE: 1. All test items have been performed and recorded as per the above standards.

2. The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Certification). The test report has been issued separately.

2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	N/A	N/A	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

3 TEST TYPES AND RESULTS

3.1 RADIATED EMISSION MEASUREMENT

3.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following.

FUNDAMENTAL FREQUENCY(MHZ)	FIELD STRENGTH OF FUNDAMENTAL (MILLIVOLTS/METER)	FIELD STRENGTH OF HARMONICS (MICROVOLTS/METER)
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
24 ~ 24.25 GHz	250	2500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation.

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
4. For fundamental frequency in "902-928MHz", the field strength of fundamental is based on Quasi-Peak.

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 18,23	May. 17,26
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 05,23	Mar. 04,24
Horn Antenna	ETS-LINDGREN	3117	00168692	Mar. 05,23	Mar. 04,24
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Sep.04, 22	Sep.03, 23
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	JS1120-3	3.2.06	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	N/A	May. 12,22	May. 11,23
10dB Attenuator	JFW/USA	50HF-010-SMA	N/A	May. 11,23	May. 10,24
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Feb. 20,23	Feb. 19,24
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May.12,22	May.11,23
Signal Pre-Amplifier	EMSI	EMC 9135	980249	May.11,23	May.10,24
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.12,22	May.11,23
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	May.11,23	May.10,24
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Feb. 17,23	Feb. 16,24
DC Source	Kikusui/JP	PMX18-5A	0000001	Aug. 12,22	Aug. 11,23
Power Meter	Anritsu	ML2495A	1506002	Feb. 14,23	Feb. 13,24
Power Sensor	Anritsu	MA2411B	1339352	Feb. 14,23	Feb. 13,24
Loop Antenna	Schwarzbeck	FMZB 1519B	00173	Sep.03,22	Sep.02,23

NOTE: 1. The calibration interval of the above test instruments is 12 months or 36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Chamber.

3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

3.1.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

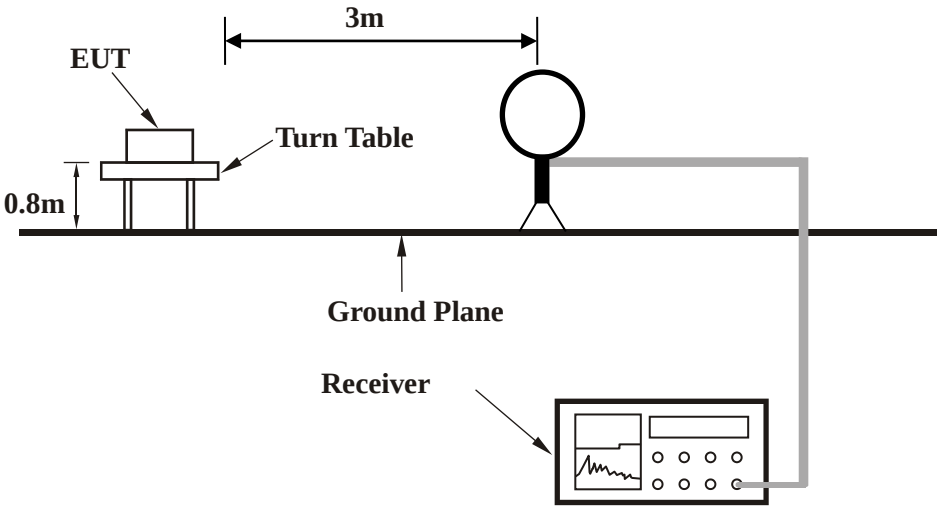
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit.
5. All modes of operation were investigated and the worst-case emissions are reported.

3.1.4 DEVIATION FROM TEST STANDARD

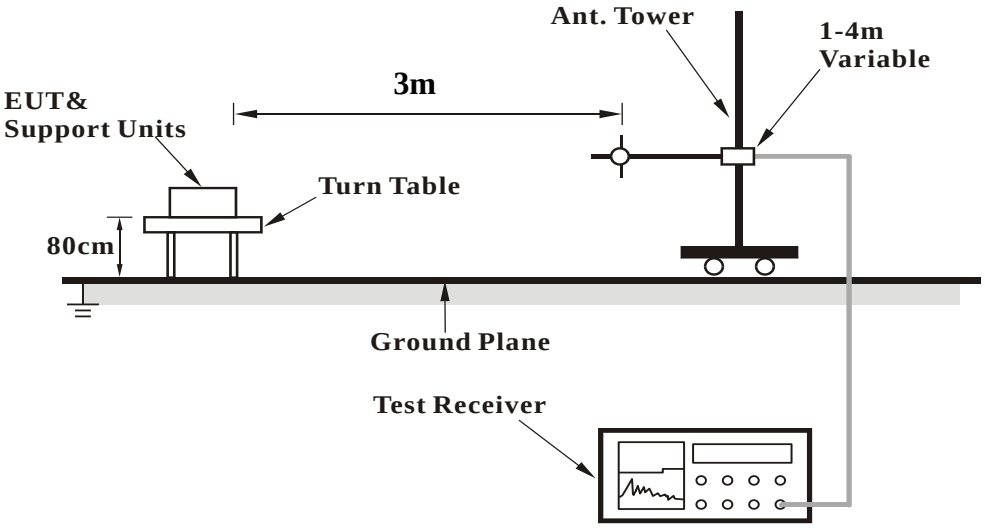
No deviation.

3.1.5 TEST SETUP

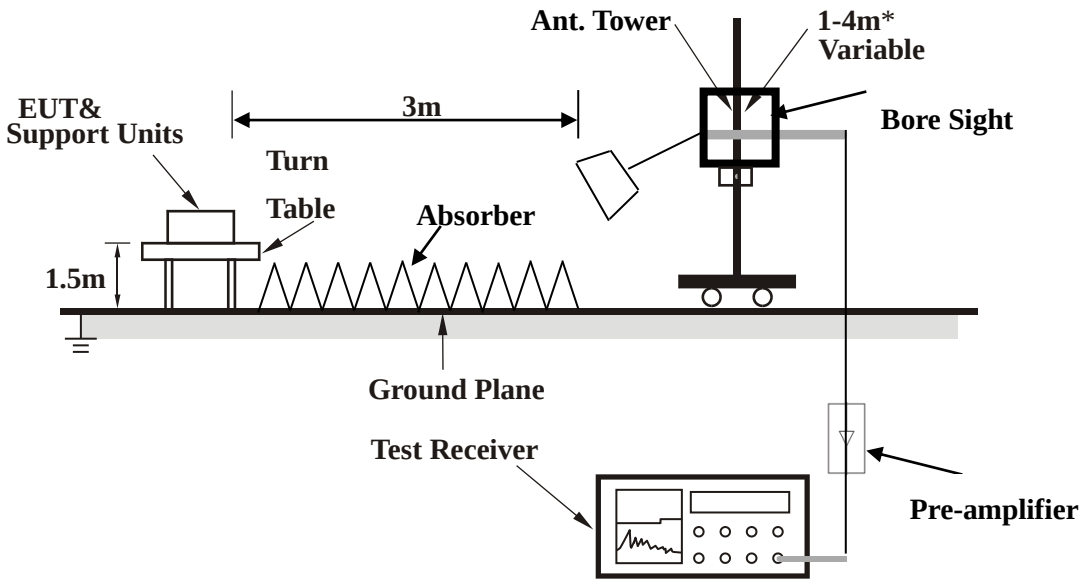
<Frequency Range 9KHz~30MHz >



< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.1.6 EUT OPERATING CONDITIONS

a. Set the EUT under full load condition and placed them on a testing table.

b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

c. The necessary accessories enable the EUT in full functions.

3.1.7 TEST RESULTS

NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

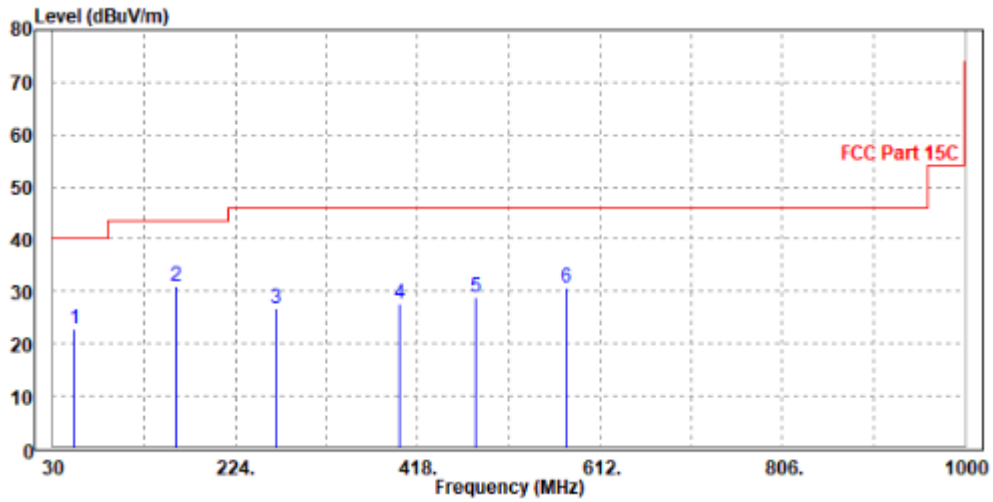
5.8G SRD

CHANNEL	High	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
52.31	22.87	49.48	40	-17.13	9.97	0.41	36.99	165	28	QP
159.98	31.1	56.03	43.5	-12.4	10.9	0.68	36.51	104	8	QP
266.68	26.81	48.55	46	-19.19	13.67	0.86	36.27	130	258	QP
398.6	27.82	47	46	-18.18	16.17	1.07	36.42	116	345	QP
480.08	28.83	46.5	46	-17.17	17.72	1.19	36.58	165	81	QP
576.11	30.63	46.78	46	-15.37	19.32	1.33	36.8	140	98	QP

REMARKS:

1. Emission Level(dBuV/m) = Read Level(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

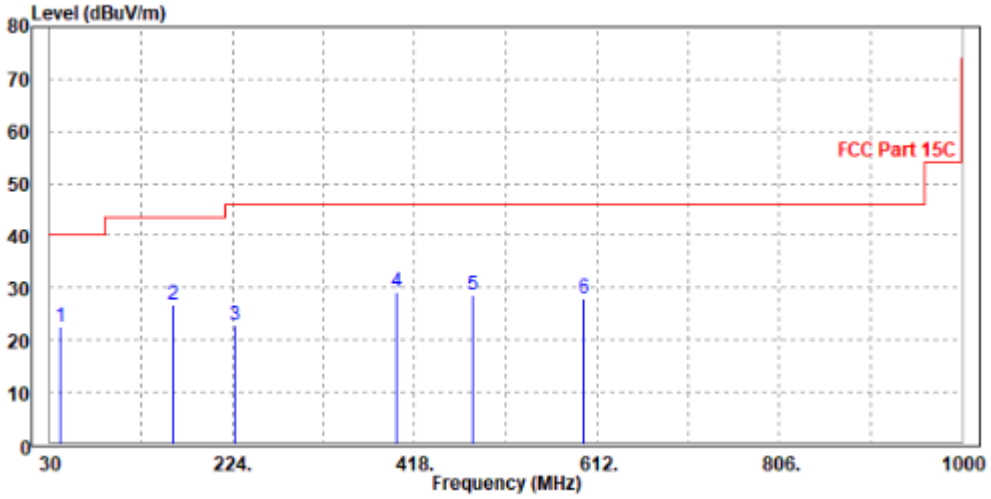


CHANNEL	High	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
41.64	22.6	47.44	40	-17.4	11.97	0.37	37.18	111	266	QP
159.98	26.74	51.67	43.5	-16.76	10.9	0.68	36.51	180	53	QP
225.94	22.82	46.24	46	-23.18	12.07	0.79	36.28	181	309	QP
398.6	29.25	48.33	46	-16.75	16.27	1.07	36.42	129	64	QP
480.08	28.65	46.7	46	-17.35	17.34	1.19	36.58	112	118	QP
598.42	27.84	43.76	46	-18.16	19.57	1.36	36.85	178	164	QP

REMARKS:

1. Emission Level(dBuV/m) = Read Level(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



ABOVE 1GHz WORST-CASE DATA:

CHANNEL	Low	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5725	60.38	60.93	74	-13.62	35.07	9.88	45.5	110	106	Peak
5725	50.66	51.21	54	-3.34	35.07	9.88	45.5	110	106	Average
5729	91.43	91.98	114	-22.57	35.07	9.88	45.5	107	99	Peak
5729	89.72	90.27	94	-4.28	35.07	9.88	45.5	107	99	Average
5875	53.92	54.24	74	-20.08	35.25	9.93	45.5	107	102	Peak
5875	48.93	49.25	54	-5.07	35.25	9.93	45.5	107	102	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5725	60.56	61.31	74	-13.44	34.87	9.88	45.5	143	96	Peak
5725	50.7	51.45	54	-3.3	34.87	9.88	45.5	143	96	Average
5729	93.1	93.85	114	-20.9	34.87	9.88	45.5	151	97	Peak
5729	90.79	91.54	94	-3.21	34.87	9.88	45.5	151	97	Average
5875	54.57	55.09	74	-19.43	35.05	9.93	45.5	148	91	Peak
5875	49.3	49.82	54	-4.7	35.05	9.93	45.5	148	91	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5729MHz: Fundamental frequency.

CHANNEL	Mid	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	53.99	54.54	74	-20.01	35.07	9.88	45.5	193	128	Peak
5725	49.68	50.23	54	-4.32	35.07	9.88	45.5	193	128	Average
5789	93.22	93.67	114	-20.78	35.15	9.9	45.5	200	122	Peak
5789	90.84	91.29	94	-3.16	35.15	9.9	45.5	200	122	Average
5875	53.9	54.22	74	-20.1	35.25	9.93	45.5	198	124	Peak
5875	49.23	49.55	54	-4.77	35.25	9.93	45.5	198	124	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	54.51	55.26	74	-19.49	34.87	9.88	45.5	119	49	Peak
5725	49.66	50.41	54	-4.34	34.87	9.88	45.5	119	49	Average
5789	91.3	91.95	114	-22.7	34.95	9.9	45.5	126	53	Peak
5789	89.45	90.1	94	-4.55	34.95	9.9	45.5	126	53	Average
5875	54.67	55.19	74	-19.33	35.05	9.93	45.5	119	50	Peak
5875	49.54	50.06	54	-4.46	35.05	9.93	45.5	119	50	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5789MHz: Fundamental frequency.

CHANNEL	High	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	54.79	55.34	74	-19.21	35.07	9.88	45.5	161	298	Peak
5725	47.59	48.14	54	-6.41	35.07	9.88	45.5	161	298	Average
5849	92.17	92.53	114	-21.83	35.22	9.92	45.5	157	288	Peak
5849	90.36	90.72	94	-3.64	35.22	9.92	45.5	157	288	Average
5875	54.15	54.47	74	-19.85	35.25	9.93	45.5	153	300	Peak
5875	48.54	48.86	54	-5.46	35.25	9.93	45.5	153	300	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5725	52.89	53.64	74	-21.11	34.87	9.88	45.5	189	25	Peak
5725	46.81	47.56	54	-7.19	34.87	9.88	45.5	189	25	Average
5849	89.62	90.18	114	-24.38	35.02	9.92	45.5	191	17	Peak
5849	87.18	87.74	94	-6.82	35.02	9.92	45.5	191	17	Average
5875	53.86	54.38	74	-20.14	35.05	9.93	45.5	180	26	Peak
5875	47.92	48.44	54	-6.08	35.05	9.93	45.5	180	26	Average

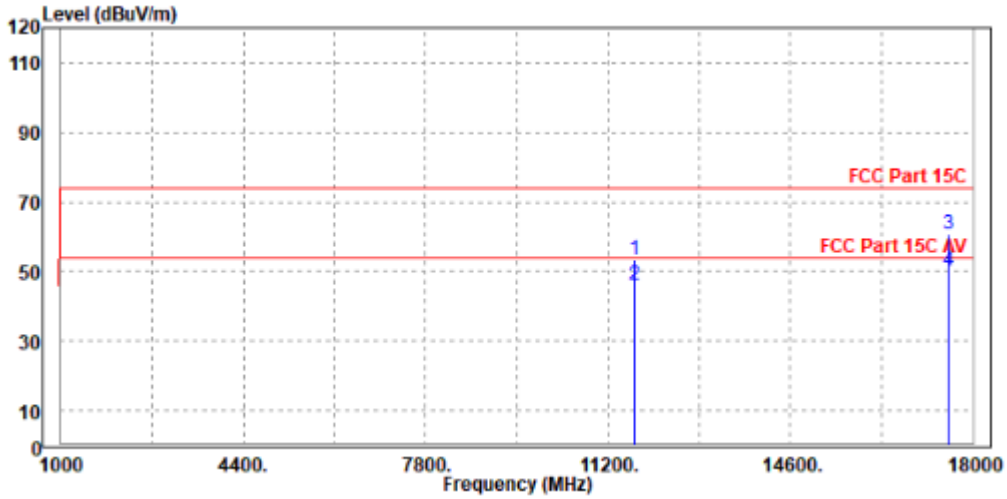
REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5849MHz: Fundamental frequency.

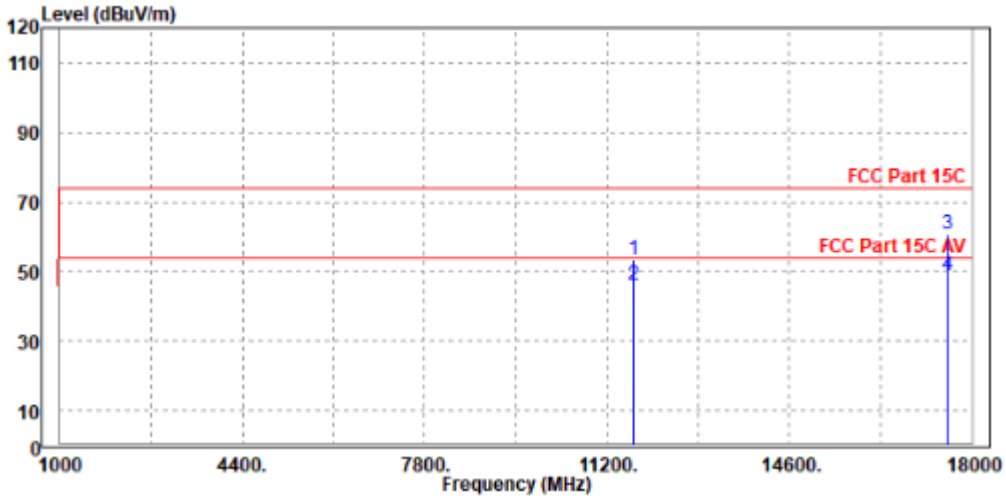
harmonic:

CHANNEL	High	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
11698	53.47	43.81	74	-20.53	38.56	14.31	43.21	156	245	Peak
11698	46.09	36.43	54	-7.91	38.56	14.31	43.21	156	245	Average
17541	60.82	42.21	74	-13.18	41.7	17.75	40.84	146	243	Peak
17541	50.02	31.41	54	-3.98	41.7	17.75	40.84	146	243	Average



ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
11698	53.61	43.59	74	-20.39	38.92	14.31	43.21	121	97	Peak
11698	46	35.98	54	-8	38.92	14.31	43.21	121	97	Average
17547	60.79	43.23	74	-13.21	40.65	17.75	40.84	131	107	Peak
17547	48.79	31.23	54	-5.21	40.65	17.75	40.84	131	107	Average



REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5849MHz: Fundamental frequency.
3. For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.

3.2 CONDUCTED EMISSION MEASUREMENT

3.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Feb. 14,23	Feb. 13,24
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Mar. 03,23	Mar. 02,24

NOTE:

1. The test was performed in CE shielded room.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

3.2.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

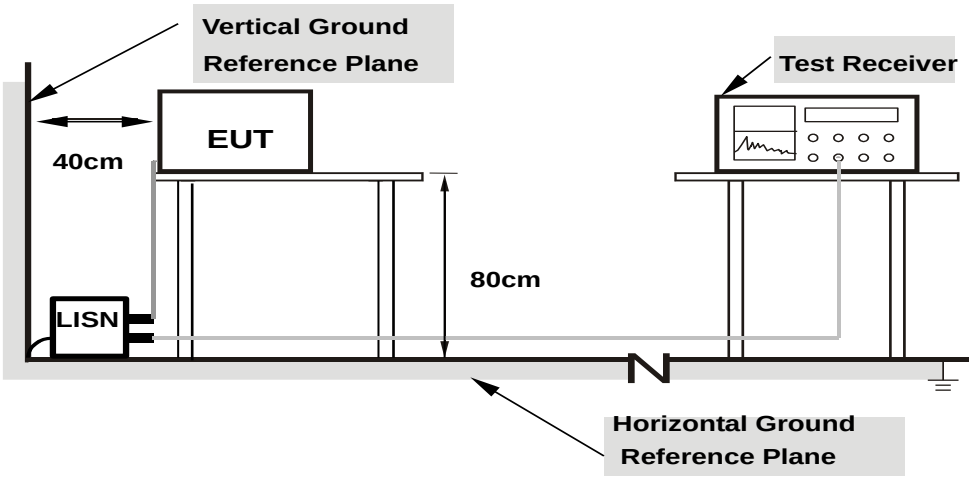
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

3.2.4 DEVIATION FROM TEST STANDARD

No deviation.

3.2.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.2.6 EUT OPERATING CONDITIONS

Same as 3.1.6.

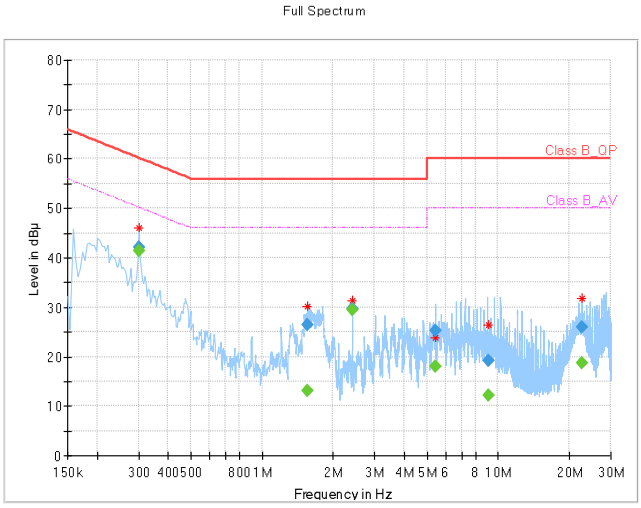
3.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA：

Frequency Range	150KHz ~ 30MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	**Environmental Conditions**	26deg. C, 51%RH
Tested By	Carl Xie		

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.300000	---	41.42	50.24	8.82	L1	ON	9.7
0.300000	42.01	---	60.24	18.23	L1	ON	9.7
1.560000	---	13.00	46.00	33.00	L1	ON	9.7
1.560000	26.55	---	56.00	29.45	L1	ON	9.7
2.412000	---	29.41	46.00	16.59	L1	ON	9.7
2.412000	29.79	---	56.00	26.21	L1	ON	9.7
5.420000	---	18.12	50.00	31.88	L1	ON	9.7
5.420000	25.35	---	60.00	34.65	L1	ON	9.7
9.128000	---	12.09	50.00	37.91	L1	ON	9.7
9.128000	19.11	---	60.00	40.89	L1	ON	9.7
22.608000	---	18.67	50.00	31.33	L1	ON	9.8
22.608000	25.92	---	60.00	34.08	L1	ON	9.8

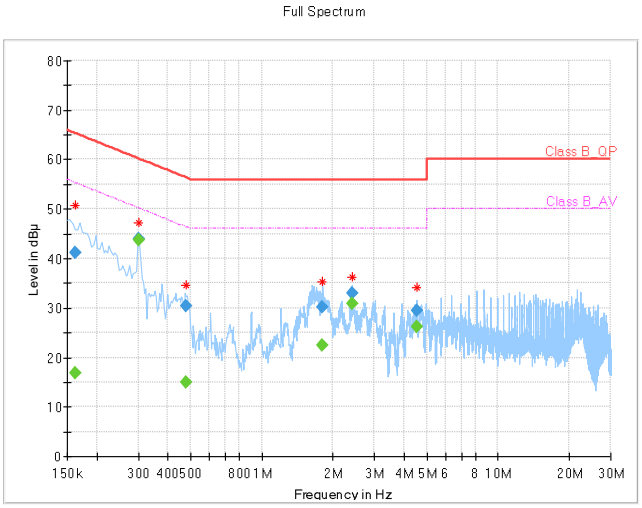
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value - Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



Frequency Range	150KHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	Environmental Conditions	26deg. C, 51%RH
Tested By	Carl Xie		

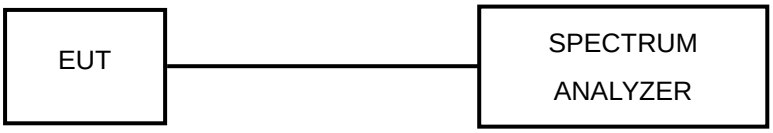
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.162000	---	16.93	55.36	38.43	N	ON	9.7
0.162000	41.19	---	65.36	24.17	N	ON	9.7
0.300000	---	43.74	50.24	6.50	N	ON	9.7
0.300000	44.05	---	60.24	16.19	N	ON	9.7
0.476000	---	14.86	46.41	31.55	N	ON	9.7
0.476000	30.37	---	56.41	26.04	N	ON	9.7
1.812000	---	22.49	46.00	23.51	N	ON	9.8
1.812000	30.07	---	56.00	25.93	N	ON	9.8
2.412000	---	30.89	46.00	15.11	N	ON	9.8
2.412000	33.04	---	56.00	22.96	N	ON	9.8
4.520000	---	26.17	46.00	19.83	N	ON	9.8
4.520000	29.58	---	56.00	26.42	N	ON	9.8

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value - Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



3.3 CHANNEL BANDWIDTH (20DB BANDWIDTH)

3.3.1 TEST SETUP



3.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.14,22	May.13,23
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.13,23	May.12,24

3.3.3 TEST PROCEDURE

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.

c. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

d. Repeat above procedures until all frequencies measured were complete.

3.3.4 DEVIATION FROM TEST STANDARD

No deviation.

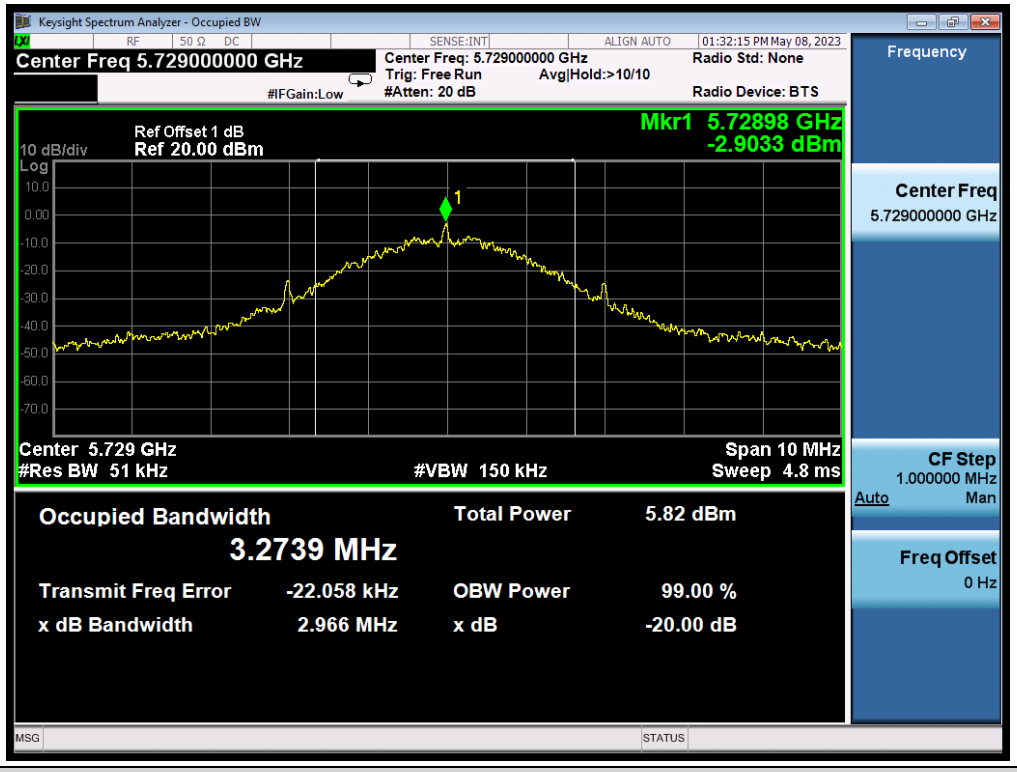
3.3.5 EUT OPERATING CONDITION

The EUT provided by client can transmission continuously at test frequency individually.

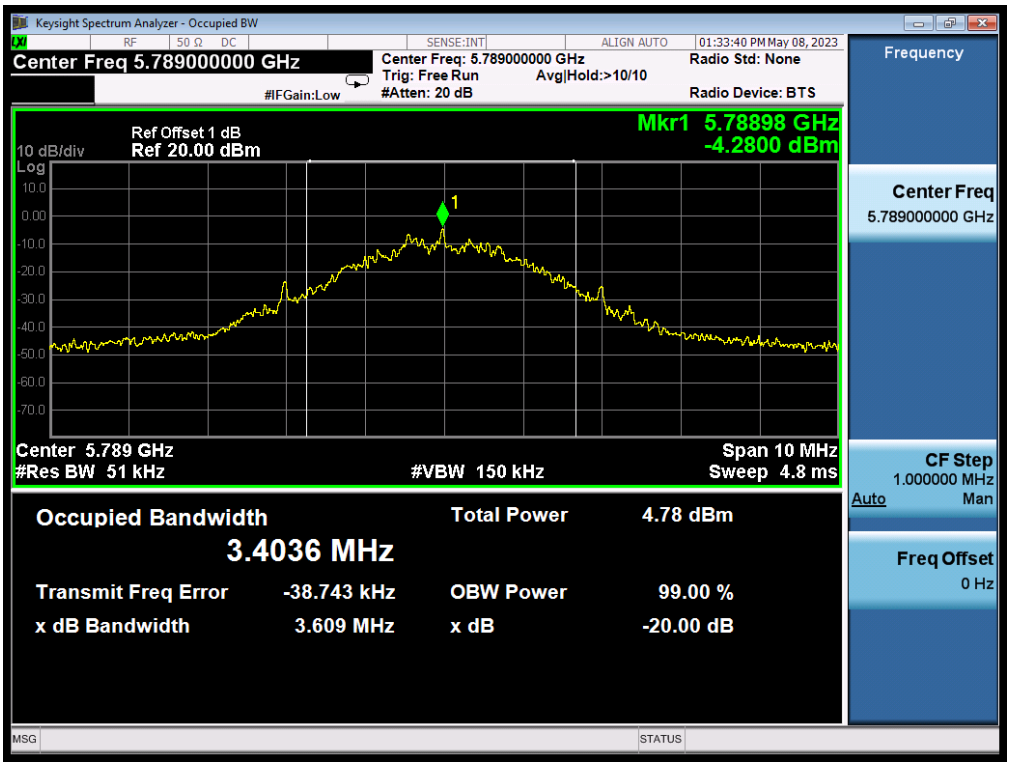
3.3.6 TEST RESULTS

Frequency (MHz)	OBW (MHz)	20dB bandwidth (MHz)	Result
5729	3.2739	2.966	Pass
5789	3.4026	3.609	Pass
5849	3.2439	4.048	Pass

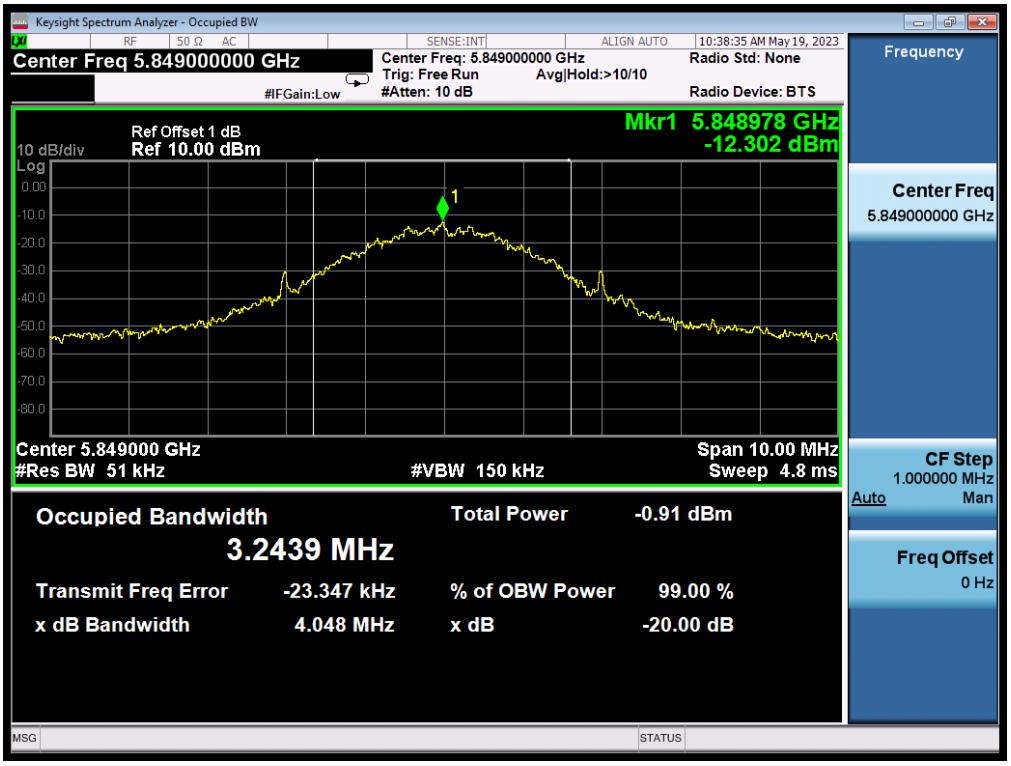
5729MHz



5789MHz


Keysight Spectrum Analyzer - Occupied BW
RF 50 Ω DC
SENSE:INT
ALIGN AUTO
01:33:40 PM May 08, 2023
Center Freq 5.789000000 GHz
Center Freq: 5.789000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#IFGain:Low
#Atten: 20 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 1 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr1 5.78898 GHz
-4.2800 dBm
Center Freq
5.789000000 GHz
Center 5.789 GHz
#Res BW 51 kHz
#VBW 150 kHz
Span 10 MHz
Sweep 4.8 ms
CF Step
1.000000 MHz
Auto
Man
Occupied Bandwidth
3.4036 MHz
Total Power
4.78 dBm
Transmit Freq Error
-38.743 kHz
OBW Power
99.00 %
x dB Bandwidth
3.609 MHz
x dB
-20.00 dB
Freq Offset
0 Hz
MSG
STATUS

5849MHz


Keysight Spectrum Analyzer - Occupied BW
RF 50 Ω AC
SENSE:INT
ALIGN AUTO
10:38:35 AM May 19, 2023
Center Freq 5.849000000 GHz
Center Freq: 5.849000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#IFGain:Low
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 1 dB
10 dB/div
Ref 10.00 dBm
Log
Mkr1 5.848978 GHz
-12.302 dBm
Center Freq
5.849000000 GHz
Center 5.849000 GHz
#Res BW 51 kHz
#VBW 150 kHz
Span 10.00 MHz
Sweep 4.8 ms
CF Step
1.000000 MHz
Auto
Man
Occupied Bandwidth
3.2439 MHz
Total Power
-0.91 dBm
Transmit Freq Error
-23.347 kHz
% of OBW Power
99.00 %
x dB Bandwidth
4.048 MHz
x dB
-20.00 dB
Freq Offset
0 Hz
MSG
STATUS

3.4 FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.

b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Connector Construction

The EUT has a metal plate Antenna arrangement, which was permanently attached and the antenna gain is 0.5dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

--- END ---